UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/574,639	02/28/2007	Michel Thiry	425.1018	4135

20311 7590 12/07/2007

LUCAS & MERCANTI, LLP
475 PARK AVENUE SOUTH
15TH FLOOR
NEW YORK, NY 10016

EXAMINER	
OGUNBIYI, OLUWATOSIN A	
ART UNIT	PAPER NUMBER
1645	

MAIL DATE	DELIVERY MODE
12/07/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/574,639	THIRY ET AL.	
	Examiner	Art Unit	
	Oluwatosin Ogunbiyi	1645	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-42* is/are pending in the application.

4a) Of the above claim(s) *5* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4,17,22-24 and 37-42* is/are rejected.

7)☒ Claim(s) *1,3,6-16,18-21 and 25-36* is/are objected to.

8)☒ Claim(s) *1-42* are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *3/31/06,4/27/06,9/24/07*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

Restriction is required under 35 U.S.C. 121 and 372.

This application contains the following inventions or groups of inventions, which are not so linked as to form a single general inventive concept under PCT Rule 13.1.

In accordance with 37 CFR 1.499, applicant is required, in reply to this action, to elect a single invention to which the claims must be restricted.

Group I: claims 1-4 and 6-42 drawn to an isolated Psp45 protein comprising at least one of the following: (a) the amino acid sequence of SEQ ID NO: 4 comprising a conservative amino acid substitution; and (b) an amino acid sequence that has at least 70% identity with the amino acid sequence of SEQ ID NO: 2 or 4; an isolated or recombinant nucleic acid encoding at least one of the following: (a) the isolated Psp45 protein of claim 1; (b) the isolated antigenic fragment of claim 2; (c) the recombinant polypeptide of claim 3; and (d) the recombinant polypeptide of claim 4; an expression vector, comprising said nucleic acid and a transcriptional control sequence, wherein the nucleic acid is operatively linked to the transcriptional control sequence; recombinant cells comprising said nucleic acids; vaccine compositions comprising said protein and methods of protecting fish.

Group II: claim 5 drawn to an antibody raised against at least one of the following: (a) the isolated Psp45 protein of claim 1; (b) the isolated antigenic fragment of claim 2; (c) the recombinant polypeptide of claim 3; and (d) the recombinant polypeptide of claim 4.

The inventions listed as Groups I and II do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: the first named

invention drawn to the protein of Group I lacks a common structure with the antibody of Group II.

Applicant is advised that the reply to this requirement to be complete must include (i) an election of a species or invention to be examined even though the requirement be traversed (37 CFR 1.143) and (ii) identification of the claims encompassing the elected invention.

The election of an invention or species may be made with or without traverse. To reserve a right to petition, the election must be made with traverse. If the reply does not distinctly and specifically point out supposed errors in the restriction requirement, the election shall be treated as an election without traverse.

Should applicant traverse on the ground that the inventions or species are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing the inventions or species to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the inventions unpatentable over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C.103 (a) of the other invention.

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Applicant's Election of an Invention and Specie

During a telephone conversation with Mr. Lawrence Manber on Nov. 8, 2007 a provisional election was made without traverse to prosecute the invention of Group I, claims 1-4 and 6-42.

Affirmation of this election must be made by applicant in replying to this office action.

Claim 5 is withdrawn from further consideration by the examiner, (37 CFR 1.142(b)), as being drawn to a non-elected invention.

Claims 1-4 and 6-42 are under examination.

Priority

Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d).

Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Drawings

The drawings in this application have been accepted. No further action by Applicant is required.

Information Disclosure Statement

The information disclosure statements filed 3/31/06, 4/27/06 and 9/24/07 have been considered. Initialed copies are enclosed.

Claim Objections

Claims 6-16,18-21 and 25-36 are objected to under 37 CFR 1.75(c) as being in improper form because a multiple dependent claim cannot depend from another multiple dependent claim. See MPEP § 608.01(n). Accordingly, the claims have not been further treated on the merits.

Claims 1 and 3 are objected to because of the following informalities: the claims contain the acronym psp45. While acronyms are permissible shorthand in the claims, the first recitation (i.e. in an independent claim) should include the full recitation followed by the acronym in parenthesis. Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:
The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-4 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter, which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The claims are drawn to an isolated Psp45 protein comprising at least one of the following: (a) the amino acid sequence of SEQ ID NO: 4 comprising a conservative amino acid substitution; and (b) an amino acid sequence that has at least 70% identity with the amino acid sequence of SEQ ID NO: 2 or 4 and isolated antigenic fragments of said protein.

The instant claims are drawn to a large genus of fragments of SEQ ID NO: 2 and SEQ ID NO: 4 (including fragments of an amino acid sequence that has at least 70% identity to SEQ ID NO: 2 and SEQ ID NO: 4) which are described only by function i.e. antigenic. To adequately describe the genus of claimed fragments that are antigenic, Applicant must adequately describe the antigenic determinants (immunoepitopes) of the fragments that are antigenic. The specification, however, does not disclose distinguishing and identifying features of a representative number of members of the genus of fragments to which the claims are drawn, such as a correlation between the structure of the immunoepitope of the antigenic fragments and its recited function (antigenic), so that the skilled artisan could immediately envision, or recognize at least a

substantial number of members of the claimed genus of antigenic fragments. Moreover, the specification fails to disclose which amino acid residues are essential to the function of the immunoepitopes found in the claimed antigenic fragments or which amino acids might be replaced so that the antigenicity of the parent antigenic fragment can be retained. Thus, the specification fails to adequately describe at least a substantial number of members of the genus of antigenic fragments to which the claims are based.

As evidenced by Greenspan et al. (Nature Biotechnology 7: 936-937, 1999), defining epitopes is not as easy as it seems. Greenspan et al. recommends defining an epitope by the structural characterization of the molecular interface between the antigen and the antibody is necessary to define an "epitope" (page 937, column 2). According to Greenspan et al., an epitope will include residues that make contact with a ligand but are energetically neutral, or even destabilizing to binding. Furthermore, an epitope will not include any residue not contacted by the antibody, even though substitution of such a residue might profoundly affect binding. Accordingly, it follows that the immunoepitopes (of an antigen) that can elicit an antibody response to a given pathogen can only be identified empirically. Therefore, absent a detailed and particular description of immunoepitopes of the large genus of antigenic fragments claimed, the skilled artisan could not immediately recognize or distinguish members of the claimed genus of said antigenic fragments. Therefore, for the reasons set forth above, claims drawn to antigenic fragments do not meet the written description requirements.

As to an isolated protein comprising an amino acid sequence that has at least 70% identity to the polypeptide set forth in SEQ ID NO: 2 or 4 the scope of the claims encompasses any polypeptide comprising any amino acid sequence at least 70% identical to the amino acid sequence set forth in SEQ ID NO: 2 or 4. The genus of said polypeptides comprising said amino acid sequences is highly variant and composed of species with different structural attributes.

The disclosure is devoid of any description of the common functional attributes and structural characteristics that identify members of the said genus of polypeptides

comprising an amino acid sequence at least 70% identical to the amino acid sequence set forth in SEQ ID NO: 2 or 4.

One of skill in the art would reasonably conclude that the disclosure of the amino acid sequence of SEQ ID NO: 2 or fails to provide a sufficient description of the genus of all polypeptides comprising an amino acid sequence at least 70% identical to SEQ ID NO: 2 or 4 wherein said genus functions similarly as SEQ ID NO: 2 or 4 (SEQ ID NO: 2 is full length p45 protein while SEQ ID NO: 4 is the p45 protein without the signal sequence). There is no description in the specification of any polypeptide comprising an amino acid sequence at least 70% identical to SEQ ID NO: 2 or 4 (except SEQ ID NO: 2 or 4) that possesses the yet unidentified function of SEQ ID NO: 2 or 4 (i.e. the p45 protein) The disclosure fails to provide a correlation between the structure of said polypeptide comprising an amino acid sequence at least 70% identical to SEQ ID NO: 2 or 4 and the function of SEQ ID NO: 2 or 4.

Absent factual evidence, a percent sequence similarity of less than 100% is not deemed to reasonably support one of skill in the art whether the biochemical activity of the claimed subject matter would be the same as that of such a similar known biomolecule i.e. the p45 protein. It is known that for nucleic acids as well as proteins, for example, that even a single nucleotide or amino acid change or mutation can destroy the function of the biomolecule in many instances, albeit not in all cases. The effects of these changes are largely unpredictable as to which ones have a significant effect versus not. Therefore, the citation of sequence similarity results in an unpredictable and therefore unreliable correspondence between the claimed biomolecule and the indicated similar biomolecule of known function and therefore lacks support regarding written description. Several publications document this unpredictability of the relationship between sequences and function albeit that certain specific sequences may be found to be conserved over biomolecule of related function upon a significant amount of further research. See the following publications that support this unpredictability as well as noting certain conserved sequences in limited specific cases: Gerhold et al. BioEssays, vol. 18, no. 12, p. 973-981, 1996; Wells et al. Journal of Leukocyte Biology, vol. 61, no. 5, p.545-550, 1997; Bork. Genome Research 2000,

10:398-400.

Therefore, one of relative skill in the art would conclude that applicant did not have possession of polypeptides comprising an amino acid sequence at least 70% identical to the amino acid sequence set forth in SEQ ID NO: 2 or SEQ ID NO: 4.

Claims 37-42 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for a fish vaccine against *Piscirickettsia salmonis* comprising the recombinant enteric bacterium *Yersinia ruckeri* expressing the *Piscirickettsia salmonis* p45 protein and a method of vaccinating said fish by administering said vaccine does not reasonably provide enablement for a vaccine comprising any other recombinant enteric bacterium encoding any other surface antigen to protect all other non-human animals against all other intracellular pathogens. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the invention commensurate in scope with these claims.

The claims are drawn to a vaccine to protect against an intracellular pathogen for use in a non-human animal comprising a recombinant enteric bacterium that encodes a surface antigen of the intracellular pathogen and a method of vaccinating a non-human animal comprising administering to the non-human animal said vaccine.

The nature of the invention is a vaccine and method of vaccinating. The claims are very broad in scope. The scope of the claims is drawn to a vaccine for any non-human animal against any intracellular pathogen comprising a recombinant enteric bacterium that encodes any surface antigen of said intracellular pathogen.

The scope of intracellular pathogens of non-humans is very broad and includes a plethora and variety of pathogens such as viruses, parasites, bacterium, fungi of a diverse array of non-human animals. Limited examples of such intracellular pathogens are *Toxoplasma gondii* (Schade et al Veterinary Parasitology 100 (2001): 63-74), *Mycobacterium bovis* (Cross et al Veterinary Microbiology 66 (1999): 235-243), *Haemophilus somnus* (Lederer et al Infection and Immunity, Feb. 1987, p. 381-387),

Microsporidia (Didier et al Veterinary Parasitology 126 (2004) 145-166), *Plasmodium* (Stowers et al Infection and Immunity, Dec. 2002, p.6961-6967) and porcine reproductive and respiratory syndrome virus (Thacker J Vet Diagn Invest 10:308-311, 1998). Also, the surface antigens of said intracellular pathogens are many and diverse and whether or not said antigens elicit a protective immune response against said pathogen is unpredictable. For example, vaccination of aotus monkeys with a surface antigen (Pvs25) of the intracellular pathogen, *Plasmodium vivax*, shows no protective efficacy (Stowers et al cited supra, p.6962 left column second full paragraph, right column, third full paragraph, p. 6963 fig.1A). For intracellular pathogens, cellular immune responses are required for protection and relevant antigen properties for this type of immunity are poorly characterized (Rollenhagen et al. PNAS, June 8, 2004 101:8739-8744). The instant specification has not characterized the immune response generated by all surface antigens contemplated in the claims and has not provided a correlation between all possible surface antigens of all intracellular pathogens with protective efficacy (from said intracellular pathogens).

It is well recognized in the vaccine art, that it is unclear whether an antigen(s) derived from a pathogen will elicit protective immunity. Ellis, R.W. (Chapter 29 of "VACCINES" [Plotkin, S.A. et al. (eds) published by W. B. Saunders company (Philadelphia) in 1988, especially page 571, 2nd full paragraph] exemplifies this problem in the recitation that "The key to the problem (of vaccine development) is the identification of that protein component of a virus or microbial pathogen that itself can elicit the production of protective antibodies ...and thus protect the host against attack by the pathogen".

The specification fails to teach other surface antigens e.g. from intracellular pathogens that confer protection from infection in a non-human animal. The specification provides guidance and working example of a vaccine comprising a *Yersinia ruckeri* enteric bacterium carrying a plasmid encoding a *Piscirickettsia salmonis* p45 gene said recombinant *Y. ruckeri* is injected into fish and wherein said injected recombinant *Y. ruckeri* having an efficacy in preventing and reducing mortality in fish

after challenge with *Piscirickettsia salmonis* (p. 51 example 2, p. 61 example 5, example 7 p.79-86).

The specification does not teach, provide guidance as to a vaccine (and method of vaccinating) comprising said recombinant *Y. ruckeri* that has protective efficacy against other intracellular pathogens infecting other non-humans apart from fish. The specification also does not teach or provide guidance at to the vaccine for any other non-humans that has protective efficacy against any other intracellular pathogens comprising ay recombinant enteric bacterium encoding any other surface antigen. There is no evidence of record presenting appropriate challenge data that indicates that the immunization of other non-human animals with a recombinant enteric bacterium encoding other surface antigens of other intracellular pathogens (see supra, for example of some intracellular pathogens) is protective. The specification fails to teach the other surface antigens that are capable of inducing an immune response in *Piscirickettsia salmonis*, other fish and other non-human animals and have protective efficacy as a vaccine.

The specification has not enabled the full scope of the claims and undue experimentation would be required of the skilled artisan to make and use the claimed vaccine.

Claims 17 and 22-24 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter, which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

As to claims 17 and 22-24, the specification lacks complete deposit information for the deposit of the *Yersinia ruckeri* cells with accession No. LMG P-22044 and LMG P-22511. Because it is not clear that said cells with the properties of LMG P-22044 or LMG P-22511 are known and publicly available or can be reproducibly isolated from nature without undue experimentation and because the claims requires LMG P-22044

or LMG P-22511, a suitable deposit for patent purposes is required. Exact replication of the bacterium is an unpredictable event.

Applicant's referral to the deposit of the bacteria on page 5 of the specification is an insufficient assurance that all required deposits have been made and all the conditions of 37 CFR §1.801-1.809 have been met.

If the deposit has been made under the provisions of the Budapest Treaty, filing of an affidavit or declaration by applicant or assignees or a statement by an attorney of record who has authority and control over the conditions of deposit over his or her signature and registration number stating that the deposit has been accepted by an International Depository Authority under the provisions of the Budapest Treaty, *that all restrictions upon public access to the deposit will be irrevocably removed upon the grant of a patent on this application and that the deposit will be replaced if viable samples cannot be dispensed by the depository is required.* This requirement is necessary when deposits are made under the provisions of the Budapest Treaty as the Treaty leaves this specific matter to the discretion of each State. Amendment of the specification to recite the date of deposit and the complete name and full street address of the depository is required.

If the deposits have not been made under the provisions of the Budapest Treaty, then in order to certify that the deposits comply with the criteria set forth in 37 CFR §1.801-1.809, assurances regarding availability and permanency of deposits are required. Such assurance may be in the form of an affidavit or declaration by applicants or assignees or in the form of a statement by an attorney of record who has the authority and control over the conditions of deposit over his or her signature and registration number averring:

(a) during the pendency of this application, access to the deposits will be afforded to the Commissioner upon request;

(b) all restrictions upon the availability to the public of the deposited biological material will be irrevocably removed upon the granting of a patent on this application;

(c) the deposits will be maintained in a public depository for a period of at least thirty years from the date of deposit or for the enforceable life of the patent of or for a

period of five years after the date of the most recent request for the furnishing of a sample of the deposited biological material, whichever is longest; and

(d) the deposits will be replaced if they should become nonviable or non-replicable.

In addition, a deposit of biological material that is capable of self-replication either directly or indirectly must be viable at the time of deposit and during the term of deposit. Viability may be tested by the depository. The test must conclude only that the deposited material is capable of reproduction. A viability statement for each deposit of a biological material not made under the Budapest Treaty must be filed in the application and must contain:

1) The name and address of the depository;

2) The name and address of the depositor;

3) The date of deposit;

4) The identity of the deposit and the accession number given by the depository;

5) The date of the viability test;

6) The procedures used to obtain a sample if the test is not done by the depository; and

7) A statement that the deposit is capable of reproduction.

As a possible means for completing the record, applicant may submit a copy of the contract with the depository for deposit and maintenance of each deposit.

Applicant's attention is directed to In re Lundack, 773 F.2d. 1216, 227 USPQ 90 (CAFC 1985) and 37 CFR §1.801-1.809 for further information concerning deposit practice.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 37 and 40 is rejected under 35 U.S.C. 102(b) as being clearly by anticipated by Simon, Benjamin. Dissertation Abstracts International, 2002, vol. 62/10-B, p. 4363 as evidenced by both Morzunov et al. Virus Research. 1995 Oct. Vol. 38:175-192 and Argenton et al, Diseases of Aquatic Organisms, vol. 24:121-127, 1996.

The claims are drawn to a vaccine to protect against an intracellular pathogen for use in a non-human animal comprising a recombinant enteric bacterium that encodes a surface antigen of the intracellular pathogen wherein the recombinant enteric bacterium is inactivated wherein the non-human animal is a fish wherein the recombinant enteric bacterium is *Yersinia ruckeri* and a method of vaccinating a non-human animal comprising administering to the non-human animal said vaccines.

Simon teaches a recombinant *Y. ruckeri* enteric bacterium. Said *Y. ruckeri* inherently encodes a surface antigen that is an outer membrane protein (Argenton et al. p. 122 left column second paragraph). Said *Y. ruckeri* is used is administered to fish. Simon also teaches that said carrying a plasmid (recombinant enteric bacterium) encoding the complete IHNV glycoprotein surface antigen (infectious pancreatic necrosis virus surface glycoprotein as evidenced by Morzunov et al, see abstract) is also administered to fish (see page 145 last paragraph of the thesis).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the

subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 38, 39,40 and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Simon, Benjamin. Dissertation Abstracts International,2002, vol. 62/10-B, p. 4363 as applied to claim 37 and 40 above in view of Gudding et al. Veterinary Immunology and Immunopathology, 72 (1999): 203-212.

Simon teaches a recombinant *Y. ruckeri* enteric bacterium. Said *Y. ruckeri* inherently encodes a surface antigen that is an outer membrane protein. Said *Y. ruckeri* is administered to fish. Simon also teaches that said *Y. ruckeri* carrying a plasmid (recombinant enteric bacterium) encoding the complete IHNV glycoprotein surface antigen is also administered to fish (see page 145 last paragraph of the thesis).

Simon does not teach that said recombinant *Y. ruckeri* is inactivated.

Gudding et al teaches an inactivated *Y. ruckeri* vaccine administered by injection to fish. Gudding teaches that said vaccine is effective and gives negligible side effects (p. 205 under inactivated vaccines). Gudding et al teaches that inactivated bacterial vaccines are routine in aquaculture.

It would have been prima facie obvious to one of ordinary skill in the art at the time the instant invention was made to inactivate the recombinant *Y. ruckeri* of Simon as taught by Gudding because Gudding teaches that administration of formalin inactivated *Y. ruckeri* is effective and gives negligible side effects and also because it is routine to inactivate bacterial vaccines used in aquaculture.

Status of the Claims

Claims 1,3,6-16,18-21 and 25-36 are objected to. Claims 1-4,17 and 22-24 are rejected. Claims 1-4,17 and 22-24 are free of art.

Conclusion

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Oluwatosin Ogunbiyi whose telephone number is 571-272-0855. The examiner can normally be reached on M-F 8:30 am - 5:00 pm. If attempts to reach the examiner by telephone are unsuccessful, the examiner's Supervisory Examiner Shannon Foley can be reached on 571-272-0898.

The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Oluwatosin Ogunbiyi
Examiner
Art Unit 1645

PATRICIA A. DUFFY
PRIMARY EXAMINER